gives rise to a displeasurable feeling, which hastens transition. Second, the more closely states are related the quicker the transition. The coördinations or reaction are not natural, but in muscular reaction the *idea* of the coördination forms a natural connecting link. As to the former factor, in muscular reaction the attention is strained, hence the passage to movement is more rapid than in sensorial. In reacting with two hands, the deviation from simultaneity may be taken absolutely, or distinguished by plus and minus signs (*i. e.*, relatively).

To determine the causes for the priority of one hand, further experiments were made. First, with other kinds of stimulus: a hammer, light, and electrical stimulation of the skin. This produced no noticeable change of result. Next, the fingers of one or both hands were made anesthetic by ether or ice, thus removing the sensation of touching the reaction-key. This lowered the mean variation perceptibly, without altering the differences. In other experiments the efficiency of the muscles on both sides was diminished by a strong electric current; this increased decidedly the average priority of the left hand. To test the influence of *attention*, one hand was consciously singled out and attention directed more closely to its movement. Comparing these results with the others, there is a marked increase of preference for the left, when that hand is designated, and generally (but less noticeable) for the right, when it is designated. In some final experiments the muscles of one arm were fatigued by tension; the effect was to *delay* the action of that hand, especially in case of the right.

Dr. Külpe argues that, since the right hand is more accustomed to grasping and pressing than the left, it would usually press harder on the reaction-key, and (greater fatigue ensuing) would react more slowly than the left. But the left hand is more dependent; hence special attention to the right benefits it less than attention to the left. Chance directing the attention may therefore explain the variations in the earlier experiments. The larger variations in sensorial reaction may be because the preconceived idea of the movement represents only the transition from apperception to movement, while in muscular it includes the entire preparation for the movement, leaving less open to chance variation. In anesthesia the idea of the coming movement is not in conflict with the sensation of the present position of the hand. With the latter present, more or less of a counter-effort is required to prevent the movement from immediate accomplishment, and this increases the attention and fatigue.

The influence of this conflict between expectation and tension on the course and duration of reaction is to be investigated in another paper.

HOWARD C. WARREN.

The subliminal consciousness. MEYERS. Proceedings of the Society for Psychical Research, 1892, Feb. 1.

Holding that automatic writing, trans-utterance, automatic picture-drawing, crystal vision, monitory voices, hallucinations and kindred phenomena are in no sense abnormal, the author proposes a hypothesis for "the provisional coördination of all these subliminal phenomena," which "does not need constant stretching to meet the exigencies of each fresh case." Assuming that we must be in some sense conscious of any sensation or volition which we can afterwards recall, it is evident that multitudes of things have entered into consciousness without our knowledge. "Our habitual or empirical consciousness" is a selection of such parts of the whole

as have proved to be, in general, advantageous to the individual. It is related to the whole of consciousness much as the visible part is to the whole of the solar spectrum. The underlying psychical unit, the abiding "individuality" in each of us, is expressed, but always incompletely, as the "personality" of our ordinary waking state. At the lower, or physiological, end are processes that have become automatic; at the superior, or psychical, end are clairvoyant and other impressions which are habitually received, and which "do in some sense transcend the limitations, of time as well as space, within which all supraliminal consciousness necessarily falls."

Examples of changed personality suggest the possibility of such a psychical reorganization as shall incorporate into our ordinary personality powers now entirely subliminal, and impressions which now reach us occasionally as "messages" from the subliminal part of our individuality, which become visual or auditory or indefinite according to the character of the personality and the attending circumstances. Such "messages" may produce hallucinations which are objective in the sense that their source is not in the individual.

Dreams are a familiar example of slight changes of personality. Hypnotic trance, hysteria and insanity are other examples. The author adduces evidence in favor of his view that "subliminal consciousness" is entitled to the epithet "conscious;" and compares the contents of supernormal phenomena with what would be expected from his hypothesis. T. P. HALL.

Aufäuge und Aussichten der experimentellen Psychologie. KÜLPE Archiv für Geschichte der Psychologie, Bd. VI., Heft 2.

An historical outline. Contributions to *experimental* psychology have been made all along by physics and physiology; but the real question is, Why was psychology so slow in becoming an *independent* science? Because, first, of the neglect with which the "lower faculties" were treated; and again, because of Kant's unfavorable verdict, called forth by the empirical psychology of the 18th century. His objections were met partly by Herbart's mathematical psychology, partly by the actual founding of experimental psychology. This owes its existence, after Weber's suggestive work, to Fechner, who by demonstrating the functional relations between psychical and physical processes, did away with the inexactness of earlier psychologies, and by developing psycho-physical methods, supplied the necessary means of research. If his work is in some respects imperfect, and his estimate of Weber's law too high, it must be remembered, on the other hand, how scant was the material gotten up by his predecessor.

Wundt, the next leader, though at first under the influence of "pure" psychology, develops to the fullest, in his later work, the principle of parallelism. For him the correlative of psychical activity is the nerve-process, while for Fechner it is the outer stimulus. The advances made by these men within the domain of psychology proper, have been seconded by work in other branches, especially astronomy and physiology. As to pathology and zoölogy, important as their results may be, they offer no room for what is, strictly speaking, psychological experiment. E. PACE.